

## Department of Energy

## §431.197

Procedure. 10 CFR Part 431, Subpart K, Appendix A.

(d) *Underground Mining Distribution Transformers.* [Reserved]

[70 FR 60416, Oct. 18, 2005, as amended at 71 FR 24997, Apr. 27, 2006; 72 FR 58239, Oct. 12, 2007]

### COMPLIANCE AND ENFORCEMENT

SOURCE: 71 FR 24997, Apr. 27, 2006, unless otherwise noted.

#### **§431.197 Manufacturer's determination of efficiency for distribution transformers.**

When a manufacturer or other party (both of which this section refers to as a "manufacturer") determines the efficiency of a distribution transformer in order to comply with an obligation imposed on it by or pursuant to Part C of Title III of EPCA, 42 U.S.C. 6311–6317, this section applies. This section does not apply to enforcement testing conducted pursuant to §431.198 of this part.

(a) *Methods used to determine efficiency*—(1) *General requirements.* A manufacturer must determine the efficiency of each basic model of distribution transformer either by testing, in accordance with §431.193 of this part and paragraphs (b)(2) and (b)(3) of this section, or by application of an alternative efficiency determination method (AEDM) that meets the requirements of paragraphs (a)(2) and (a)(3) of this section; provided, however, that a manufacturer may use an AEDM to determine the efficiency of one or more of its untested basic models only if it determines the efficiency of at least five of its other basic models (selected in accordance with paragraph (b)(1) of this section) through actual testing. For each basic model of distribution transformer that has a configuration of windings which allows for more than one nominal rated voltage, the manufacturer must determine the basic model's efficiency either at the voltage at which the highest losses occur or at each voltage at which the transformer is rated to operate.

(2) *Alternative efficiency determination method.* A manufacturer may apply an AEDM to a basic model pursuant to paragraph (a)(1) of this section only if:

(i) The AEDM has been derived from a mathematical model that represents the electrical characteristics of that basic model;

(ii) The AEDM is based on engineering and statistical analysis, computer simulation or modeling, or other analytic evaluation of performance data; and

(iii) The manufacturer has substantiated the AEDM, in accordance with paragraph (a)(3) of this section, by applying it to, and testing, at least five other basic models of the same type, *i.e.*, low-voltage dry-type distribution transformers, medium-voltage dry-type distribution transformers, or liquid-immersed distribution transformers.

(3) *Substantiation of an alternative efficiency determination method.* Before using an AEDM, the manufacturer must substantiate the AEDM's accuracy and reliability as follows:

(i) Apply the AEDM to at least five of the manufacturer's basic models that have been selected for testing in accordance with paragraph (b)(1) of this section, and calculate the power loss for each of these basic models;

(ii) Test at least five units of each of these basic models in accordance with the applicable test procedure and paragraph (b)(2) of this section, and determine the power loss for each of these basic models;

(iii) The predicted total power loss for each of these basic models, calculated by applying the AEDM pursuant to paragraph (a)(3)(i) of this section, must be within plus or minus five percent of the mean total power loss determined from the testing of that basic model pursuant to paragraph (a)(3)(ii) of this section; and

(iv) Calculate for each of these basic models the percentage that its power loss calculated pursuant to paragraph (a)(3)(i) is of its power loss determined from testing pursuant to paragraph (a)(3)(ii), compute the average of these percentages, and that calculated average power loss, expressed as a percentage of the average power loss determined from testing, must be no less than 97 percent and no greater than 103 percent.

(4) *Subsequent verification of an AEDM.* (i) Each manufacturer that has used an AEDM under this section shall have available for inspection by the Department of Energy records showing: The method or methods used; the mathematical model, the engineering or statistical analysis, computer simulation or modeling, and other analytic evaluation of performance data on which the AEDM is based; complete test data, product information, and related information that the manufacturer has generated or acquired pursuant to paragraph (a)(3) of this section; and the calculations used to determine the efficiency and total power losses of each basic model to which the AEDM was applied.

(ii) If requested by the Department, the manufacturer shall conduct simulations to predict the performance of particular basic models of distribution transformers specified by the Department, analyses of previous simulations conducted by the manufacturer, sample testing of basic models selected by the Department, or a combination of the foregoing.

(b) *Additional testing requirements—(1) Selection of basic models for testing if an AEDM is to be applied.* (i) A manufacturer must select basic models for testing in accordance with the following criteria:

(A) Two of the basic models must be among the five basic models with the highest unit volumes of production by the manufacturer in the prior year, or during the prior 12-calendar-month period beginning in 2003,<sup>1</sup> whichever is later;

(B) No two basic models should have the same combination of power and voltage ratings; and

(C) At least one basic model should be single-phase and at least one should be three-phase.

(ii) In any instance where it is impossible for a manufacturer to select basic models for testing in accordance with all of these criteria, the criteria shall be given priority in the order in which they are listed. Within the limits im-

posed by the criteria, basic models shall be selected randomly.

(2) *Selection of units for testing within a basic model.* For each basic model a manufacturer selects for testing, it shall select and test units as follows:

(i) If the manufacturer would produce five or fewer units of a basic model over a reasonable period of time (approximately 180 days), then it must test each unit. However, a manufacturer may not use a basic model with a sample size of fewer than five units to substantiate an AEDM pursuant to paragraph (a)(3) of this section.

(ii) If the manufacturer produces more than five units over such period of time, it must either test all such units or select a sample of at least five units at random and test them. Any such sample shall be comprised of production units of the basic model, or units that are representative of such production units.

(3) *Applying results of testing.* In a test of compliance with a represented efficiency, the average efficiency of the sample,  $\bar{X}$ , which is defined by

$$\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i$$

where  $X_i$  is the measured efficiency of unit  $i$  and  $n$  is the number of units tested, must satisfy the condition:

$$\bar{X} \geq \frac{100}{1 + \left( 1 + \frac{0.08}{\sqrt{n}} \right) \left( \frac{100}{RE} - 1 \right)}$$

where RE is the represented efficiency.

EFFECTIVE DATE NOTE: At 71 FR 24997, Apr. 27, 2006, § 431.197 was added, effective May 30, 2006, except for paragraph (a)(4)(i) which contains information collection requirements and will not become effective until approval has been given by the Office of Management and Budget.

**§ 431.198 Enforcement testing for distribution transformers.**

(a) *Test notice.* Upon receiving information in writing, concerning the energy performance of a particular distribution transformer sold by a particular manufacturer or private labeler, which indicates that the transformer may not be in compliance with

<sup>1</sup>When identifying these five basic models, any basic model that does not comply with Federal energy conservation standards for distribution transformers that may be in effect shall be excluded from consideration.